

AS-DEPOSITED PLANAR OPTICAL WAVEGUIDES WITH LOW SCATTERING LOSS
AND METHODS FOR THEIR MANUFACTURE

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5

ABSTRACT OF THE DISCLOSURE

An as-deposited waveguide structure is formed by a vapor deposition process without etching of core material. A planar optical device of a lighthouse design includes a ridge-structured lower cladding layer of a low refractive index material. The lower cladding layer has a planar portion and a ridge portion extending above the planar portion. A core layer of a core material having a higher refractive index than the low refractive index material of the lower cladding layer overlies the top of the ridge portion of the lower cladding. A slab layer of the core material overlies the planar portion of the lower cladding layer. The lighthouse waveguide also includes a top cladding layer of a material having a lower refractive index than the core material, overlying the core layer and the slab layer. A method of forming an as-deposited waveguide structure includes first forming a ridge structure in a layer of low refractive index material to provide a lower cladding layer. Next a layer of core material is deposited over the ridge structure by a vapor deposition process. Finally, a top cladding layer of a material having a lower refractive index than the core material is deposited over the core layer.